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(54) **CONNECTOR**

(71) Applicant: **YAZAKI CORPORATION**, Tokyo (JP)

(72) Inventors: **Tohru Kobayashi**, Makinohara (JP); **Shoji Yamamoto**, Fujieda (JP)

(73) Assignee: **YAZAKI CORPORATION**, Tokyo (JP)

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(51) **Int. Cl.**

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H01R 13/58	(2006.01)
H01R 13/629	(2006.01)

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(58) **Field of Classification Search**

USPC 439/136, 471, 452, 157, 460, 470

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,603,913	A *	9/1971	Hasty, Jr.	439/471
3,638,169	A *	1/1972	Caveney et al.	439/471
3,732,526	A *	5/1973	Punako	439/471

(Continued)

FOREIGN PATENT DOCUMENTS

CN	1198032	A	11/1998
JP	UM-A-S49-143785	A	8/1972

(Continued)

OTHER PUBLICATIONS

International Search Report dated Oct. 21, 2011 issued in International Application No. PCT/JP2011/066773 (PCT/SA/210).

(Continued)

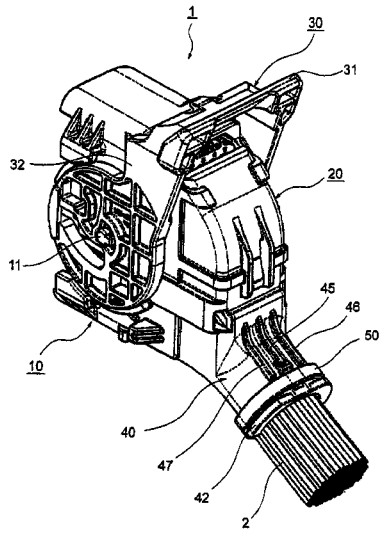
Primary Examiner — Jean F Duverne

(74) *Attorney, Agent, or Firm* — Sughrue Mion, PLLC

(57) **ABSTRACT**

In a connector, a flange portion is provided at an end portion of an electric wire fixing portion. A rib is provided on outer surface of the electric wire fixing portion. A biding band winding space is provided between an end of the rib and the flange portion. An interval therebetween has a width equal to a width of the binding band. The electric wire is fixed by the binding band wound on the binding band winding space. A band passing hole is formed between the end of the rib and the flange portion. A plurality of side ribs are symmetrically provided at both sides of the rib. The binding band is inserted through the band passing hole, in response to a volume of the electric wire or in response to a size of a radius of curvature of the electric wire led out from the connector housing.

11 Claims, 7 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

3,792,417	A	2/1974	Punako	
5,074,805	A *	12/1991	Kirma	439/452
5,192,224	A *	3/1993	Bernardini	439/471
6,056,587	A	5/2000	Matsuoka et al.	
6,762,363	B2 *	7/2004	Yamashita et al.	174/74 R
7,618,280	B2 *	11/2009	Horst	439/460
2002/0170736	A1	11/2002	Yamashita et al.	
2008/0303272	A1	12/2008	Takahashi et al.	

FOREIGN PATENT DOCUMENTS

JP	2002-343497	A	11/2002
JP	2008305612	A	12/2008
JP	2010-34018	A	2/2010
JP	2010-55893	A	3/2010
JP	201055863	A	3/2010
WO	2009048546	A1	4/2009

OTHER PUBLICATIONS

Written Opinion dated Oct. 21, 2011 issued in International Application No. PCT/JP2011/066773 (PCT/SA/237).

Japanese Office Action; Application No. 2010-162458; issued Jul. 11, 2014.

Office Action, Issued by the State Intellectual Property Office of P.R. China, Dated Dec. 9, 2014, In counterpart Chinese Application No. 201180035717.4.

* cited by examiner

Fig. 1

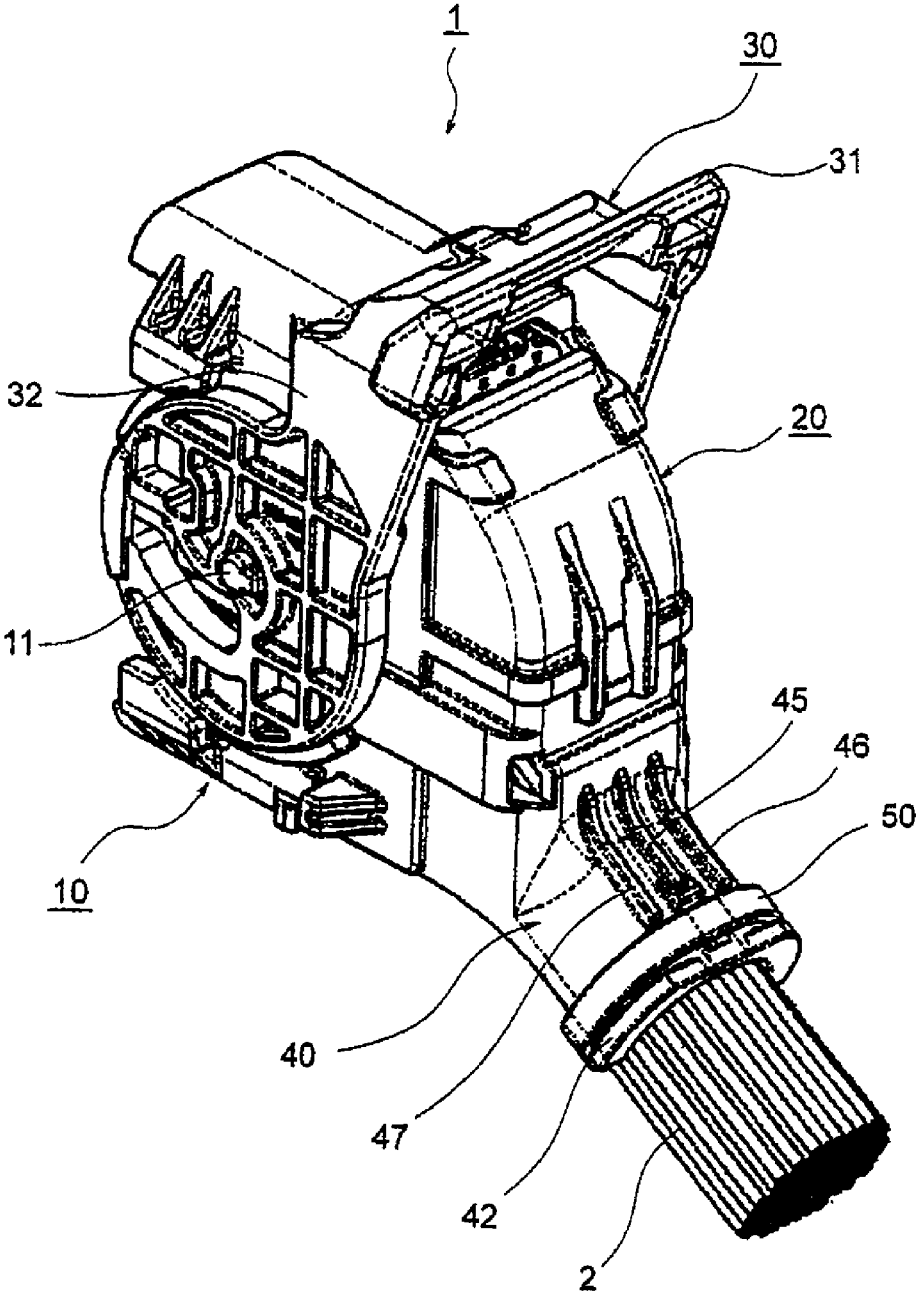


Fig. 2

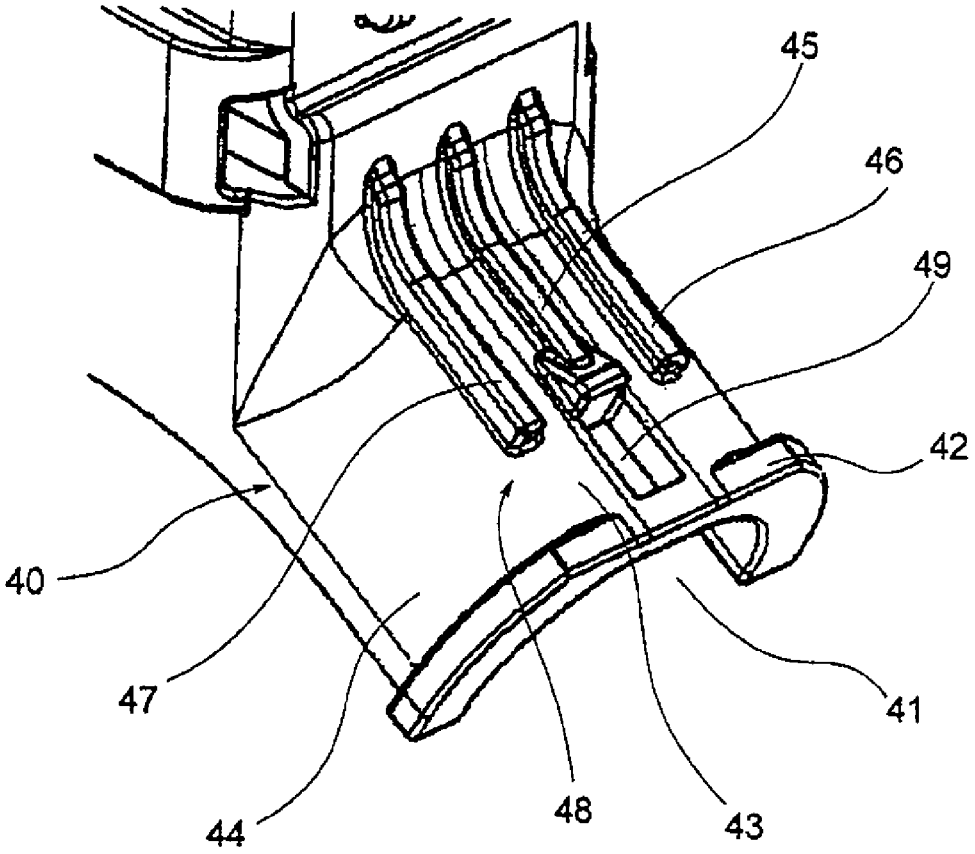


Fig. 3

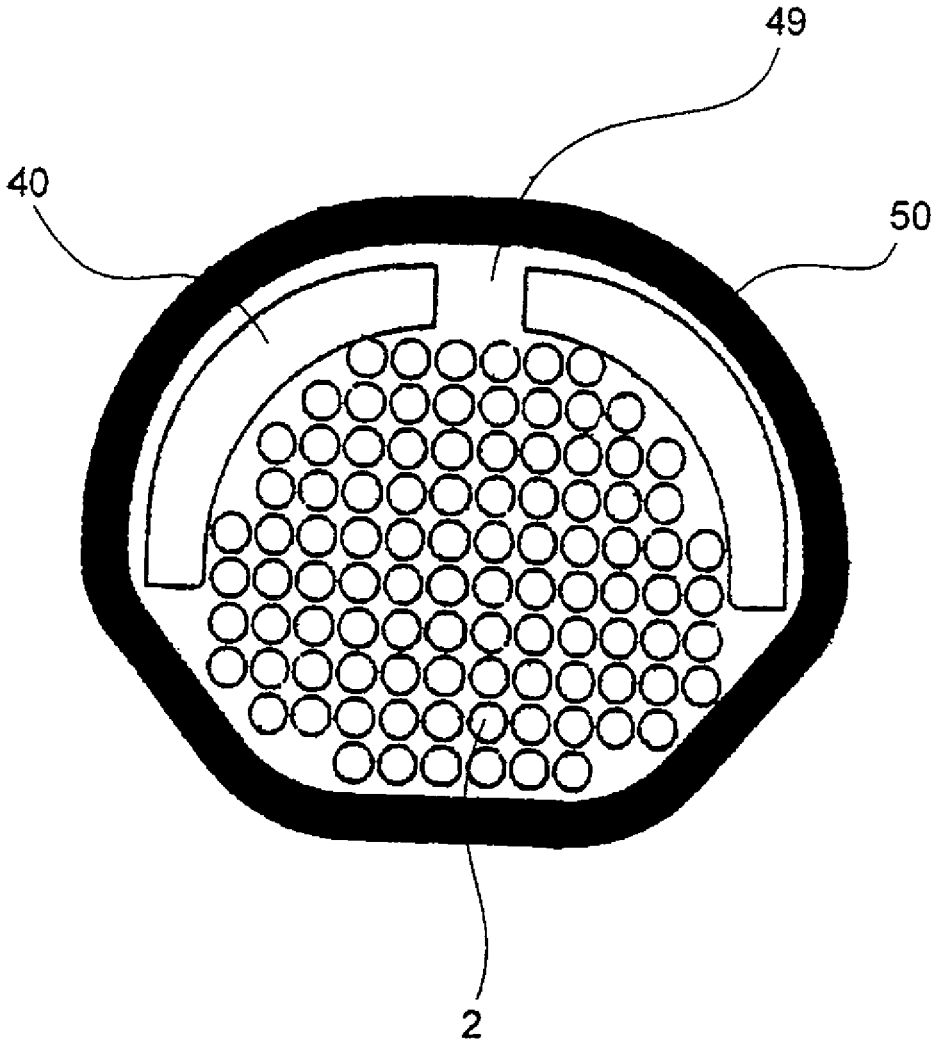
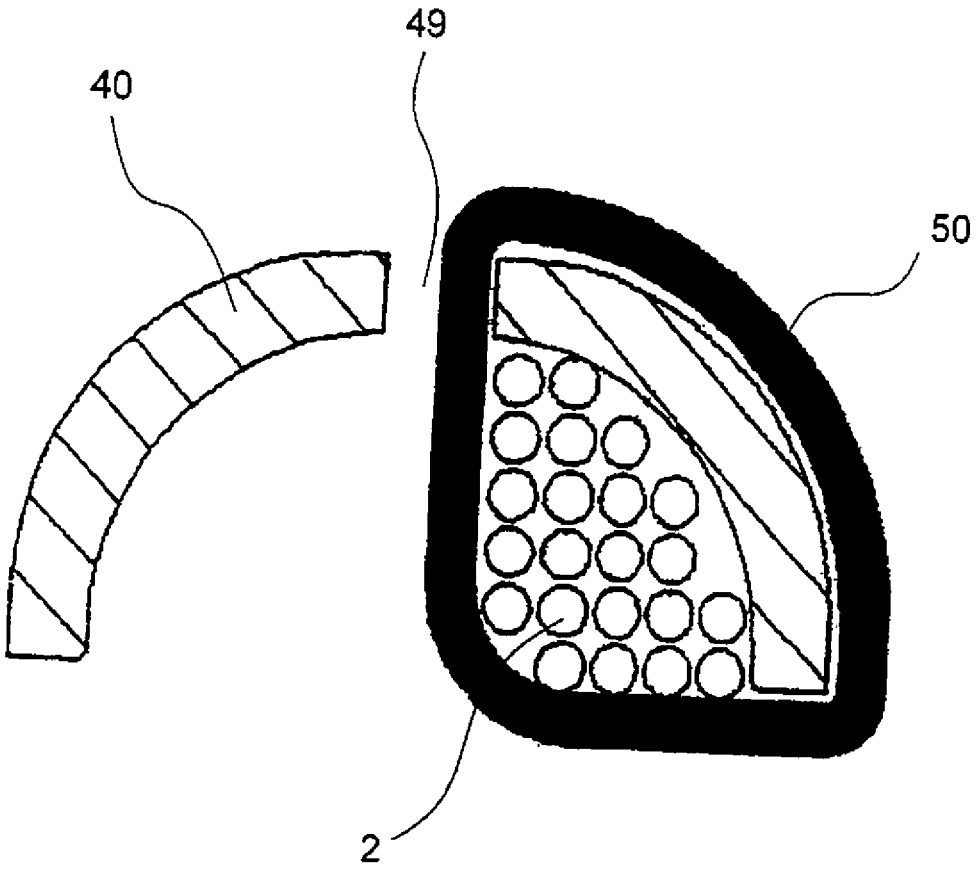


Fig. 4



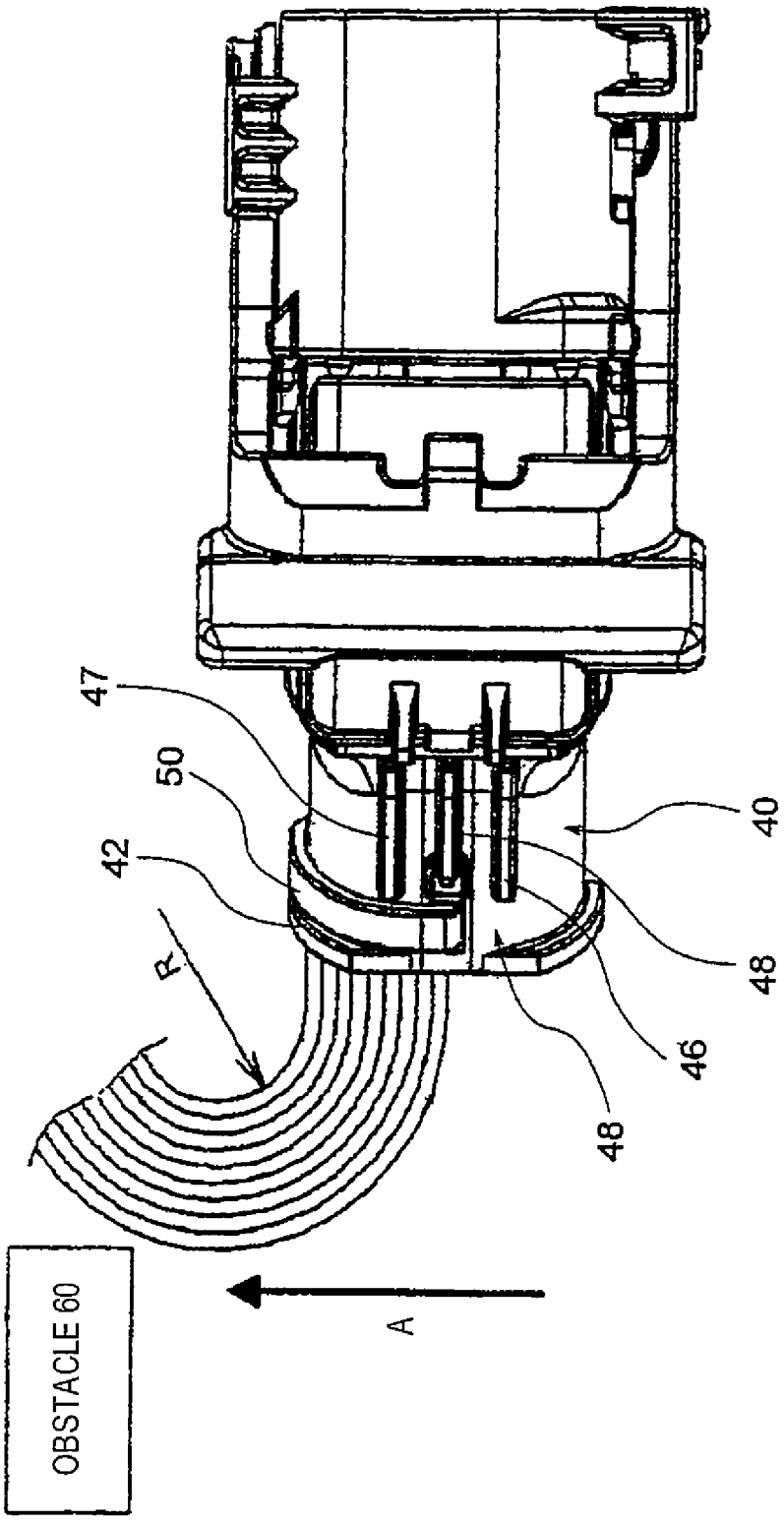


Fig. 5

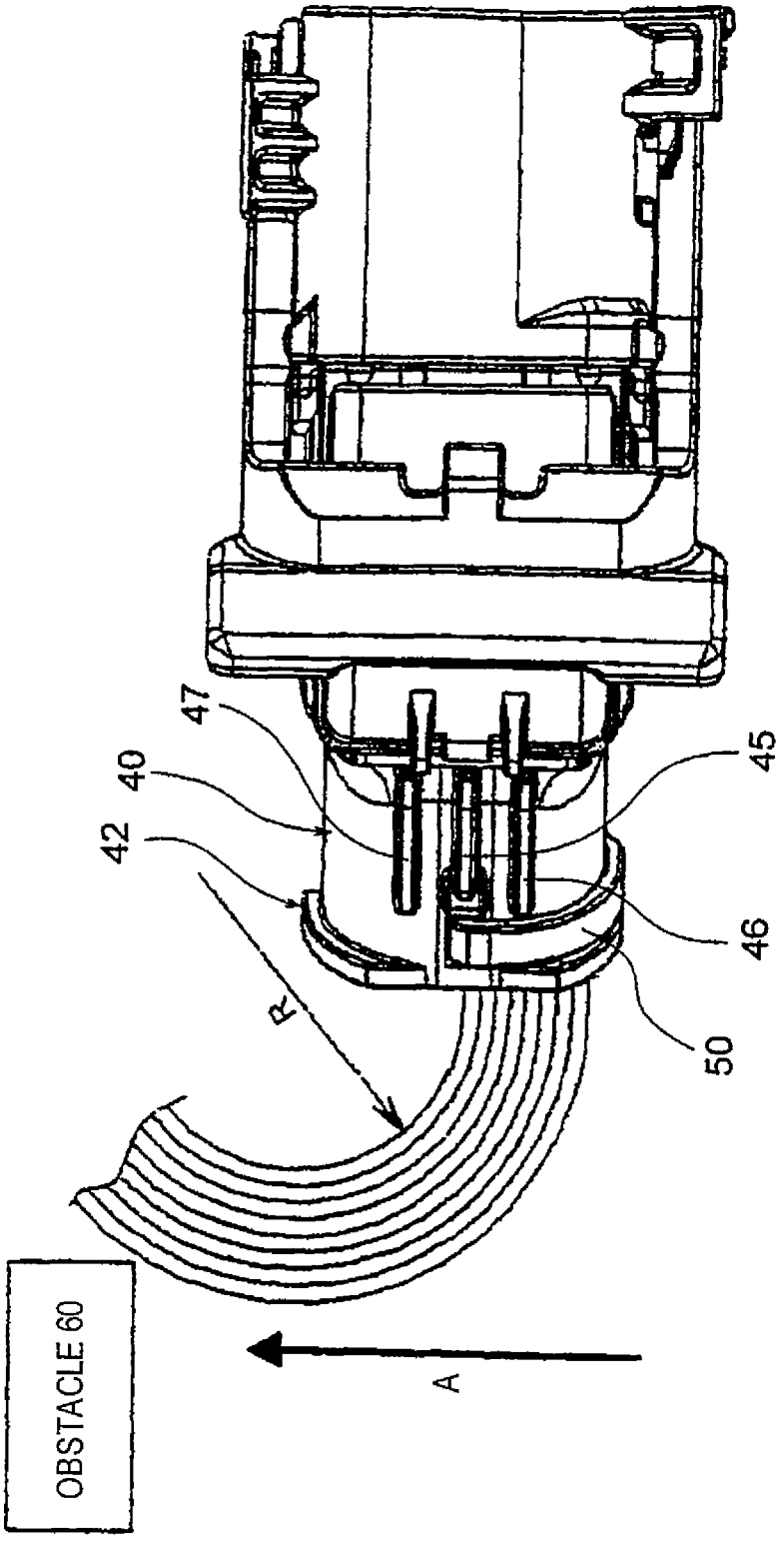


Fig. 6

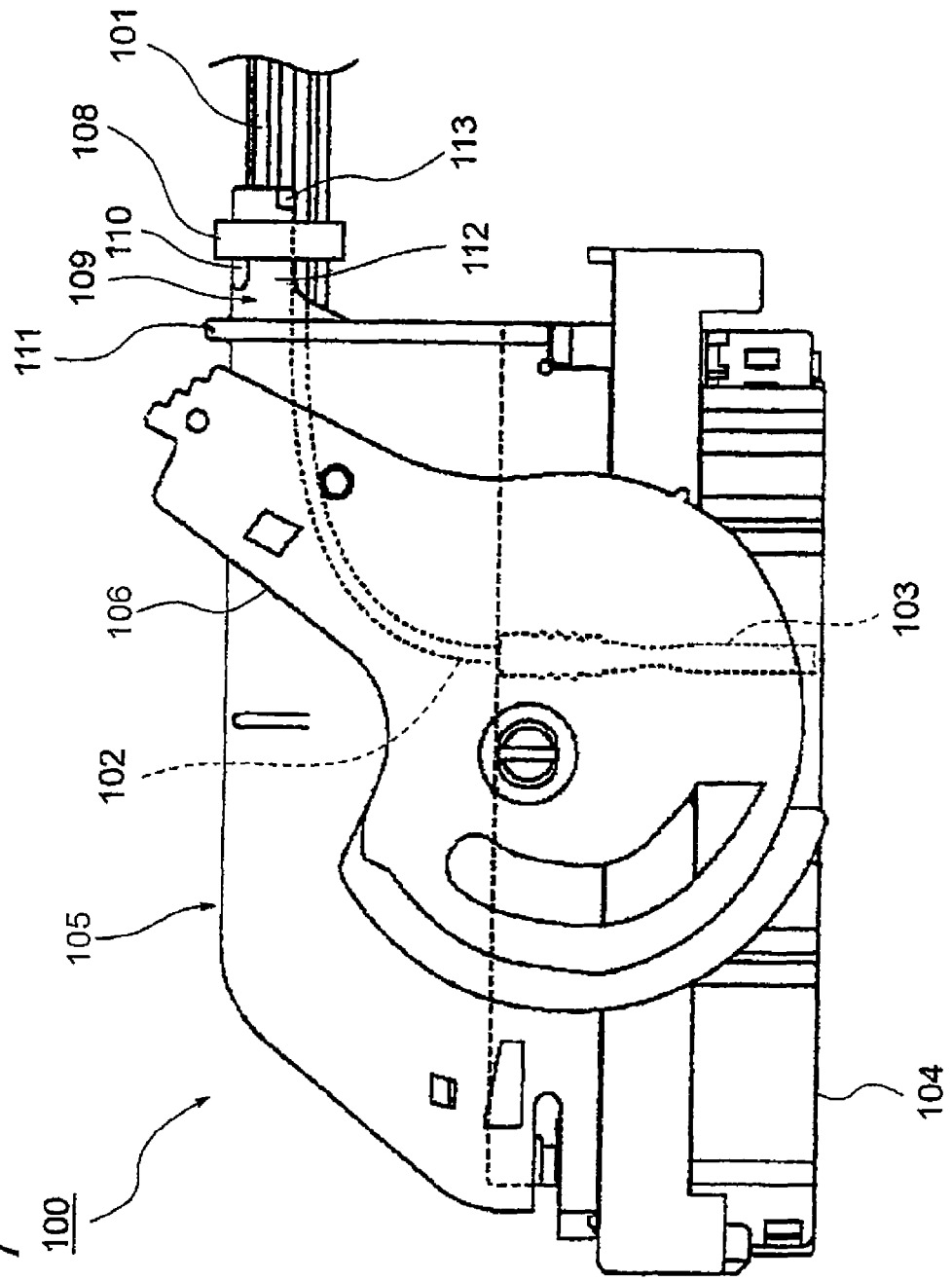


Fig. 7

CONNECTOR

TECHNICAL FIELD

The present invention is related to a connector equipped with a cover, that covers and protects electric wires which are pulled out from a connector housing containing terminals connected to end portions of the electric wires correspondingly, and guides the electric wires to lead them to an outside.

BACKGROUND ART

As the connector with a cover, there is the connector as shown in FIG. **7** (see PTL 1).

A connector **100** shown in FIG. **7** includes a connector housing **104** that contains terminals **103** that are connected to one end portions **102** of electric wires **101** correspondingly therein. A cover **105** for leading the electric wires **101**, which are pulled out from the connector housing **104**, to the outside while guiding the electric wires is attached to the connector housing **104**. Also, a lever **106** is attached to the cover **105** so as to straddle in a width direction of the cover **105**.

A flange portion **111** is formed on an electric wire leading port of the cover **105**, from which the electric wires **101** are led toward the outside. Also, an electric wire fixing portion **109**, in which the electric wires **101** are fastened and fixed by a binding band **108** and which has an almost gate-shaped section, is provided at the electric wire leading port so as to protrude outward. Also, a pair of band passing holes **110**, through which the binding band **108** is passed respectively, are formed at corner portions on both sides of the electric wire fixing portion **109**.

Also, the electric wire fixing portion **109** is configured so that the binding band **108** for binding the electric wires **101** can be wound thereon. A pair of retaining projections **113** are provided at the end of the electric wire fixing portion **109** at the electric wires **101** leading side such that the projections **113** protrude outward from rear bottom ends of both side walls **112** of the electric wire fixing portion **109**. The pair of retaining projections **113** prevent the wounded binding band **108** being slipped off.

That is, when the binding band **108** is wound on the electric wire fixing portion **109** without passing through the band passing hole **110**, the binding band **108** wound on the electric wire fixing portion **109** is prevented being slipped off by the flange portion **111** and the projections **113**.

CITATION LIST

Patent Literature

[PTL 1] JP-A-2002-343497
[PTL 2] JP-A-2010-55863
[PTL 3] JP-A-2010-34018

SUMMARY OF INVENTION

Technical Problem

However, in the conventional connector **100**, when the binding band **108** is wound on the electric wire fixing portion **109** without passing through the band passing hole **110**, a distance between the flange portion **111** and the projections **113** is larger than a width of the binding band **108** wound on the electric wire fixing portion **109**. Therefore, the binding band **108** is moved between the flange portion **111** and the projections **113**. As a result, such a problem exists that the electric wires **101** may be damaged by the binding band **108**.

Also, in the conventional connector **100**, two band passing holes **110** are still formed in the electric wire fixing portion **109**. In a case where the binding band **108** is wound on the electric wire fixing portion **109** without passing through the band passing hole **110**, when the electric wire fixing portion **109** is fastened excessively by the binding band **108**, the cover **105** is deformed. As a result, such a problem arises that the electric wires **101** are fastened excessively tightly.

In PTLs 2 and 3, the reinforcing rib is provided to the connector **100**. Nevertheless, the binding band **108** wound on the electric wire fixing portion **109** is moved between the flange portion **111** and the projections **113**. As a result, the problem that the electric wires **101** may be damaged by the binding band **108** is not led to a solution.

It is therefore one advantageous aspect of the present invention to provide a connector that is able to bind selectively electric wires freely in response to a volume of the bound number of electric wires or in response to a size of a radius of curvature of the electric wires that are to be arranged to curve, such that a movement of the binding band wound on an electric wire fixing portion is not caused even in the situation that the binding band is wound on the electric wire fixing portion without pass through a band passing hole.

Solution to Problem

According to one advantage of the invention, there is provided a connector, comprising:

a connector housing, configured to accommodate a terminal connected to an end of an electric wire;

a cover, attached to the connector housing, and configured to lead the electric wire from the connector housing to an outside;

an electric wire fixing portion, provided at an electric wire leading port formed in the cover where the electric wire is led out;

a flange portion, provided at an end portion of the electric wire fixing portion where the electric wire is pulled out from the connector housing;

a rib, provided on outer surface of the electric wire fixing portion, extending in a longitudinal direction of the electric wire fixing portion at a center thereof;

a biding band winding space, provided between an end of the rib and the flange portion, an interval therebetween having a width equal to a width of a binding band, wherein the electric wire is fixed by the binding band wound on the binding band winding space;

a band passing hole, formed between the end of the rib and the flange portion, configured so that the binding band is inserted therethrough; and

a plurality of side ribs, symmetrically provided at both sides of the rib,

wherein, when the electric wire is fixed in the electric wire fixing portion by the binding band, the binding band is inserted through the band passing hole, in response to a volume of the electric wire or in response to a size of a radius of curvature of the electric wire led out from the connector housing.

The band passing hole may be a slit extending in the longitudinal direction of the electric wire fixing portion.

The rib and the flange may be configured to restrict a movement of the binding band in the longitudinal direction of the electric wire fixing portion.

Advantages Effects of Invention

According to the present invention, even when the binding band is wound on the electric wire fixing portion without

passing through the band passing hole, the electric wires can be bound freely selectively in response to a volume of the bound number of electric wires or in response to a size of a radius of curvature of the electric wires that are to be arranged to curve, such that a movement of the binding band being wound on the electric wire fixing portion is not caused.

Also, according to the present invention, a movement of the band can be restricted by an end portion of the rib that extends in the longitudinal direction of the electric wire.

According to the present invention, even when the electric wires are fastened excessively by the binding band in such a situation that the binding band is wound on the electric wire fixing portion without passing through the band passing hole, it can be prevented that deformation in shape of the cover is caused.

According to the present invention, the band passing hole is provided in the middle of the electric wire fixing portion like a slit shape in the longitudinal direction. Therefore, when the electric wires are to be bound by passing the binding band through the band passing hole, these electric wires can be bound by selecting freely whether or not the binding band is passed through the band passing hole, in response to a volume of the bound number of electric wires or in response to a size of a radius of curvature of the electric wires that are to be arranged to curve. As a result, it can be prevented that a movement of the binding band in the longitudinal direction of the electric wire fixing portion is caused after the electric wires are bound.

According to the present invention, when the binding band is wound on the electric wire fixing portion without passing through the band passing hole, it can be restricted by the rib and the flange portion that the binding band is moved in the longitudinal direction of the electric wire fixing portion. As a result, it can be prevented that the binding band is moved in the longitudinal direction of the electric wire fixing portion after the electric wires are bound by the binding band.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a perspective view showing a connector according to an embodiment of the present invention when viewed from the cover side.

FIG. **2** is a fragmental enlarged perspective view showing such a state that a cover is removed from the connector shown in FIG. **1**.

FIG. **3** is a view showing such a state that electric wires are wound and bound such that a binding band is not passed through a band passing hole in an electric wire fixing portion of the cover of the connector shown in FIG. **1**.

FIG. **4** is a view showing such a state that the electric wires are wound and bound on one side such that the binding band is passed through the band passing hole in the electric wire fixing portion of the cover of the connector shown in FIG. **1**.

FIG. **5** is a view showing such a state that the electric wires are wound and bound on one side in a small radius of curvature R state to circumvent an obstacle such that the binding band is passed through the band passing hole in the electric wire fixing portion of the cover of the connector shown in FIG. **1**.

FIG. **6** is a view showing such a state that the electric wires are wound and bound on the other side in a large radius of curvature R state to circumvent the obstacle such that the binding band is passed through the band passing hole in the electric wire fixing portion of the cover of the connector shown in FIG. **1**.

FIG. **7** is a side view showing a connector in the prior art.

DESCRIPTION OF EMBODIMENTS

A connector as a subject of the present invention is equipped with a connector housing that contains the terminals connected to end portions of electric wires respectively. A cover for guiding the electric wires that are pulled out from the connector housing and leading them toward the outside is fitted to this connector housing. An electric wire fixing portion in which the electric wires are fastened and fixed by a binding band is provided to an electric wire leading port from which the electric wires in this cover are led to the outside. Also, a band passing hole through which the binding band is passed is formed in this electric wire fixing portion.

In the present invention, in the connector constructed in this manner, a flange portion is formed on an end portion of the electric wire fixing portion on the electric wire passing side. Ribs that are extended in the longitudinal direction of the electric wire fixing portion are formed on an outer peripheral surface of the electric wire fixing portion in the middle of the electric wire fixing portion. Also, a binding band winding space whose interval is set substantially equal to a width of the binding band is provided between ends of the ribs and the flange portion on the electric wire fixing portion.

Further, a band passing hole through which the binding band is passed is provided in the binding band winding space between ends of the ribs and the flange portion.

According to such configuration, when the electric wires are to be bound and fixed by the binding band in the electric wire fixing portion, the electric wires can be bound by the binding band, while selecting freely whether or not the binding band should be passed through the band passing hole to bind the electric wires or whether or not the binding band should not be passed through the band passing hole to bind the electric wires, in response to a volume of the bound number of electric wires or in response to a size of a radius of curvature of the electric wires that are to be arranged to curve.

An embodiment of the invention will be explained with reference to FIGS. **1** to **6** hereunder. FIG. **1** is a perspective view showing a connector according to an embodiment of the present invention when viewed from the cover side. FIG. **2** is a fragmental enlarged perspective view showing such a state that a cover is removed from the connector shown in FIG. **1**. FIG. **3** is a view showing such a state that electric wires are wound and bound such that a binding band is not passed through a band passing hole in an electric wire fixing portion of the cover of the connector shown in FIG. **1**. FIG. **4** is a view showing such a state that the electric wires are wound and bound on one side such that the binding band is passed through the band passing hole in the electric wire fixing portion of the cover of the connector shown in FIG. **1**. FIG. **5** is a view showing such a state that the electric wires are wound and bound on one side in a small radius of curvature R state to circumvent an obstacle such that the binding band is passed through the band passing hole in the electric wire fixing portion of the cover of the connector shown in FIG. **1**. FIG. **6** is a view showing such a state that the electric wires are wound and bound on the other side in a large radius of curvature R state to circumvent the obstacle such that the binding band is passed through the band passing hole in the electric wire fixing portion of the cover of the connector shown in FIG. **1**. FIG. **7** is a side view showing a connector in the prior art.

In FIG. **1**, a perspective view of the connector according to the present invention when viewed from the cover side is shown.

In FIG. **1**, a connector **1** includes a connector housing **10** that is made of a synthetic resin and contains the terminals (not shown) that are connected to one end portions of electric wires **2** respectively. A pivot portion **11** is provided to both sides of the connector housing **10** respectively. This connector housing **10** is formed like a box shape that has terminal containing cells in which a plurality of terminals are contained correspondingly. Also, a cover **20** that is made of a synthetic resin is fitted to this connector housing **10** so as to lead the electric wires **2** being pulled out from the connector housing **10** to the outside while guiding the electric wires.

Also, a lever **30** is fitted to straddle this cover **20** in the width direction. This lever **30** is supported turnably on the pivot portions **11** that are provided to the connector housing **10**.

The lever **30** enables an opposite connector housing (not shown) to be fitted into the connector housing **10** with a small inserting force. That is, the lever **30** is formed like a substantially gate shape whose plate-like arm portion **32** is extended from both ends of an operating portion **31** that extends in the lateral direction. The arm portions **32** located on both sides are fitted to the pivot portion **11** respectively, and the lever **30** is fitted to turn around the pivot portion **11**.

When this lever **30** is operated to turn, the operation to fit the opposite connector housing into the connector housing **10** is assisted by the cam action.

The cover **20** is formed of synthetic resin material, and is formed like an almost box shape that is opened downward and rearward. An upper portion of the connector housing **10** is fitted into an opening portion of the cover **20** on the lower side. Thus, the cover **20** is attached in a state that it covers an upper area of the connector housing **10**.

Also, an electric wire fixing portion **40** for fixing the electric wires **2** being pulled out from the connector housing **10** therein is formed at the back of the cover **20**. An opening of the electric wire fixing portion **40**, through which the electric wires **2** are extended, is formed as an electric wire leading port **41**. This electric wire leading port **41** is shaped to lead the electric wire **2** being pulled out from the connector housing **10** to the outside while guiding these electric wires **2**.

As shown in FIG. **2**, the electric wire fixing portion **40** of the cover **20** is opened like an arch shape, and a flange portion **42** is formed at the electric wire leading port **41** as an opening end so as to protrude toward the outer periphery side. Also, an upper wall **43** and a pair of side walls **44** connected to right and left parts of the upper wall **43** are formed as an upper portion of the electric wire fixing portion **40** to have a substantial gate-like sectional shape or an arch-like sectional shape. Thus, an outer peripheral surface of the electric wire fixing portion **40** is constructed by the upper wall **43** and a pair of side walls **44** of the electric wire fixing portion **40**.

A main rib **45** is formed in a center of the upper wall **43** of the electric wire fixing portion **40** to extend from a root portion of the electric wire fixing portion **40** in the longitudinal direction of the electric wire fixing portion **40**. A binding band winding space **48** whose interval is set substantially equal to a width of a binding band **50** is provided to a end of the main rib **45** such that the binding band **50** for binding/fixing the electric wires **2** can be wound between the end of the main rib **45** and the flange portion **42**.

Also, at least two side ribs **46**, **47** are provided on both sides of the main rib **45** provided in the middle of the upper wall **43** of the electric wire fixing portion **40**. The number of the side ribs **46**, **47** provided on both sides of the main rib **45** is not always limited to two, and any plural number that is in excess of two may be employed.

The main rib **45** and the side ribs **46**, **47** have an effect to increase the strength of the electric wire fixing portion **40**.

Also, like the main rib **45**, the binding band winding space **48** whose interval is set substantially equal to the width of the binding band **50** is also provided to ends of the side ribs **46**, **47** such that the binding band **50** for binding/fixing the electric wires **2** can be wound between the ends of the side ribs **46**, **47** and the flange portion **42**.

Also, a band passing hole **49**, through which the binding band **50** is passed between the end of the main rib **45** and the flange portion **42**, is provided in the upper wall **43** of the electric wire fixing portion **40** on which the binding band winding space **48** is formed between the main rib **45** and the flange portion **42**.

Also, the band passing hole **49** is formed like a slit shape in a center of the electric wire fixing portion **40** on a prolonged line of the main rib **45** in the longitudinal direction. This band passing hole **49** is provided such that the binding band **50** is passed through this hole from the upper wall **43** side of the electric wire fixing portion **40** to the inner wall surface of the electric wire fixing portion **40**.

The binding band **50** is formed like a strip shape. This binding band **50** is wound on the binding band winding space **48** formed between the ends of the main rib **45** and the side ribs **46**, **47** on the electric wire fixing portion **40** and the flange portion **42**. The binding band **50** is used to bind/fix the electric wires **2** that are extended from the connector housing **10**.

When the binding band **50** is wound on the binding band winding space **48** of the electric wire fixing portion **40** not to pass through the band passing hole **49**, a movement of the wound binding band **50** in the longitudinal direction of the electric wire fixing portion **40** is restricted by the ends of the main rib **45** and the side ribs **46**, **47** and the flange portion **42**.

An action of the connector according to the present invention constructed in this manner will be explained with reference to FIGS. **3** to **6** hereunder.

When the electric wires **2** extended from the connector housing **10** are bound/fixed in the cover **20**, as shown in FIG. **3**, the binding band **50** is wound on the electric wires **2** and the electric wire fixing portion **40** to fasten, while pushing the bundle of the electric wires **2** against the inner wall surface of the electric wire fixing portion **40**. An example in FIG. **3** shows the case where the number of the electric wires **2** being bound/fixed by the cover **20** is large and the binding band **50** is not passed through the band passing hole **49**.

When the number of the electric wires **2** being bound and fixed by the cover **20** is small, as shown in FIG. **4**, the bundle of the electric wires **2** extended from the connector housing **10** is pushed against one inner wall surface of the electric wire fixing portion **40** with respect to a center of the band passing hole **49**, and then the bundle of the electric wires **2** is fastened by winding the binding band **50** on the electric wire fixing portion **40** to pass through the band passing hole **49**.

Since the binding band **50** is wound to pass through the band passing hole **49** in this manner, the bundle of the electric wires **2** can be bound/fixed such that the bundle of the electric wires **2** is pushed against either of left and right inner wall surface of the electric wire fixing portion **40** with respect to the center of the band passing hole **49**.

As shown in FIGS. **5** and **6**, for example, in the situation that the binding band **50** is wound to pass through the band passing hole **49**, the user can select which the electric wires **2** is pushed against either of left and right inner sides of the electric wire fixing portion **40** with respect to the center of the band passing hole **49** when an obstacle **60** exists in vicinity of the electric wire leading port **41** of the electric wire fixing

portion **40**. In FIGS. **5** and **6**, the electric wire is bended in a direction shown by an arrow A.

That is, the case shown in FIG. **5** illustrates the case where a radius of curvature R of the bundle of the electric wires **2** is set small such that this bundle of the electric wires **2** being extended from the connector housing **10** can circumvent this obstacle **60**. Also, the case shown in FIG. **6** illustrates the case where the radius of curvature R of the bundle of the electric wires **2** is set large such that this bundle of the electric wires **2** being extended from the connector housing **10** can circumvent this obstacle **60**.

In this manner, when the bundle of the electric wires **2** is bound and fixed on the electric wire fixing portion **40**, along which the binding band **50** is passed through the band passing hole **49** and wound, can be selected in response to the number or the outer diameter of the electric wires **2** to be fixed. Thus, the electric wires **2** can be fixed tightly to the electric wire fixing portion **40**. Also, the arrangement that the band passing hole **49** is arranged in the middle of the electric wire fixing portion **40** makes it possible to select the fixing method in response to the number of electric wires and to change the fixing direction according to on the surrounding environment.

Further, when the obstacle **60** exists in vicinity of the electric wire leading port **41** of the electric wire fixing portion **40**, the bundle of the electric wires **2** must be curved to circumvent this obstacle **60**. At this time, the radius of curvature R of the bundle of the electric wires **2** can be set large, while considering a stress applied to the curved portion, by fixing the bundle of the electric wires **2** in the position of the electric wire fixing portion **40** located oppositely to the direction A, as shown in FIG. **6**. Therefore, the radius of curvature R of the bundle of the electric wires **2** can be set large, and also a stress applied to the bundle of the electric wires **2** can be lessened.

According to the embodiment of the connector **1**, the situation that the electric wires **2** are nicked by the binding band **50** can be prevented by preventing a displacement of the binding band **50**. Also, the strength of the electric wire fixing portion **40** can be increased by the main rib **45** and the side ribs **46**, **47**.

Also, according to the embodiment of the connector **1** according to the present invention, the band passing hole **49** is arranged in the middle of the electric wire fixing portion **40**. Therefore, the fixing method can be selected in accordance with the number of the electric wires **2**, and also the fixing method for the bundle of the electric wires can be selected according to on the surrounding environment. As a result, a stress applied to the electric wires **2** can be lessened, and also a break of the electric wires **2** can be prevented.

The present application is based on Japanese Patent Application No. 2010-162458 filed on Jul. 20, 2010, the contents of which are incorporated herein by way of reference.

INDUSTRIAL APPLICABILITY

The present invention is extremely useful in providing a connector that is able to prevent the electric wire being damaged.

REFERENCE SIGNS LIST

1 connector
2 electric wire
10 connector housing
20 cover
30 lever
40 electric wire fixing portion
41 electric wire leading port
42 flange portion
43 upper wall
44 a pair of side walls
45 main rib
46 side rib
47 side rib
48 binding band winding space
49 band passing hole
50 binding band
60 obstacle

What is claimed is:

1. A connector, comprising:
a connector housing, configured to accommodate a terminal connected to an end of an electric wire;
a cover, attached to the connector housing, and configured to lead the electric wire from the connector housing to an outside;
an electric wire fixing portion, provided at an electric wire leading port formed in the cover where the electric wire is led out;
a flange portion, provided at an end portion of the electric wire fixing portion where the electric wire is pulled out from the connector housing;
a rib, separate from a covering of the electric wire, provided on an outer surface of the electric wire fixing portion, extending in a longitudinal direction of the electric wire fixing portion at a center thereof;
a binding band winding space, provided between an end of the rib and the flange portion, and interval therebetween having a width equal to a width of a binding band, wherein the electric wire is fixed by the binding band wound on the binding band winding space;
a band passing hole, formed between the end of the rib and the flange portion, configured so that the binding band is inserted therethrough; and
a plurality of side ribs, separate from the covering of the electric wire, symmetrically provided at both sides of the rib,
wherein, when the electric wire is fixed in the electric wire fixing portion by the binding band, the binding band is inserted through the band passing hole, in response to a volume of the electric wire or in response to a size of a radius of curvature of the electric wire led out from the connector housing.

2. The connector according to claim **1**, wherein
the band passing hole is a slit provided at a center of the binding band winding space on a prolonged line of the rib, the slit extending in the longitudinal direction of the electric wire fixing portion.

3. The connector according to claim **1**, wherein
the rib and the flange portion are walls of the binding band winding space configured to restrict a movement of the binding band in the longitudinal direction of the electric wire fixing portion.

4. The connector according to claim **1**, wherein each of said plurality of side ribs respectively extends both parallel to said rib and perpendicular to a longitudinal direction of the binding band.

5. The connector according to claim **1**, wherein the a binding band winding space is defined by a binding band winding housing configured to house the binding band such that a width of the binding band winding housing and a width of the binding band are equal.

6. The connector according to claim **1**, wherein the plurality of side ribs are provided on the outer surface of the electric wire fixing portion.

7. The connector according to claim 1, wherein the rib and the side ribs have substantially similar shapes.

8. The connector according to claim 1, wherein the rib and the side ribs are formed on a same surface of the electric wire fixing portion.

9. The connector according to claim 1, wherein the side ribs are rectangular-shaped.

10. The connector according to claim 1, wherein the rib and the side ribs are substantially equal in length.

11. A connector, comprising:

a connector housing, configured to accommodate a terminal connected to an end of an electric wire;

a cover, attached to the connector housing, and configured to lead the electric wire from the connector housing to an outside;

an electric wire fixing portion, provided at an electric wire leading port formed in the cover where the electric wire is led out;

a flange portion, provided at an end portion of the electric wire fixing portion where the electric wire is pulled out from the connector housing;

a rib, separate from a covering of the electric wire, provided on an outer surface of the electric wire fixing portion, extending in a longitudinal direction of the electric wire fixing portion at a center thereof;

a binding band winding space, provided between an end of the rib and the flange portion, and interval therebetween having a width equal to a width of a binding band, wherein the electric wire is fixed by the binding band wound on the binding band winding space;

a band passing hole, formed between the end of the rib and the flange portion, configured so that the binding band is inserted therethrough; and

a plurality of side ribs, separate from the covering of the electric wire, symmetrically provided at both sides of the rib,

wherein, when the electric wire is fixed in the electric wire fixing portion by the binding band, the binding band is inserted through the band passing hole, in response to a volume of the electric wire or in response to a size of a radius of curvature of the electric wire led out from the connector housing, and

the band passing hole is a slit provided at a center of the binding band winding space on a prolonged line of the rib, the slit extending in the longitudinal direction of the electric wire fixing portion.

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